

## A revision of the genus *Auzata* Walker

(Lepidoptera, Drepanidae)

By

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(1 plate and 47 fig.)

### Introduction

Walker (1862) erected this genus for a single new species *semipavonaria* Walker. Kirby (1892) removed *Argyris superba* Butler, 1878, from its original genus to *Auzata* Walker. *Auzata simplicciata* Warren, *A. minima* Leech, and *A. chinensis* Leech were then added by Warren (1897), and Leech (1898). Gaede (1931) listed *Gonocilix ocellata* Warren, 1896; *G. renifera* Warren, 1900; *Auzata (Auzatella) micronioides* Strand, 1916; and *Auzatellodes desquamata* Strand, 1916, together with the five species mentioned above.

Three of the nine species listed by Gaede have now been removed from this genus. *Auzata (Auzatella) micronioides* Strand has been transferred to *Leucodrepana* Hampson: *Leucodrepana micronioides* (Strand), (**comb. nov.**). *Auzatella* Strand thus becomes a synonym of *Leucodrepana* Hampson (**syn. nov.**).

*Gonocilix renifera* Warren is certainly congeneric with *Leucoblepsis tiistis* Swinhoe: *Leucoblepsis renifera* (Warren) (**comb. nov.**).

The systematic position of *Auzatellodes desquamata* Strand is doubtful, and until its affinities are known I propose to re-erect *Auzatellodes* Strand as a monotypic genus with *A. desquamata* Strand as the type species.

The remaining six species listed by Gaede are dealt with in this paper and four new subspecies are described.

### Material

Apart from the large collection of this genus in the British Museum (Natural History), material from the following sources was examined: Deutsches Entomologisches Museum, Berlin; Naturhistorisches Museum, Vienna; Zoologisches Forschungsinstitut and Museum Alexander Koenig, Bonn.

### Acknowledgements

My grateful thanks are due to Professor Dr. H. Sachtleben and Dr. R. Schönmann who arranged loans of material through their respective institutions, and to Dr. H. Höne who very kindly arranged for me to study his unique oriental collection.

I am indebted to Mr. D. K. Mugford for his practical assistance.

### Treatment

All the species now listed under *Auzata* Walker have been redescribed, the genitalia of both sexes (where known) have been figured, and plates of the upper side of the whole insect have been prepared for those species which have not been satisfactorily illustrated previously. The scale placed by each drawing or group of drawings represents one millimetre.

The colour atlas compiled by Villalobos-Dominguez and Villalobos (1947) has been used in the descriptions where the areas of colour were large enough to allow an accurate evaluation of them to be made.

All the type specimens have been located and examined: these are deposited in the British Museum (Natural History) unless otherwise stated

Measurements have been recorded as follows: (a) mean wing span (twice distance between apex of fore wing and centre of mesonotum); (b) range of measurements of wing span; (c) number of specimens measured.

### *Auzata* Walker

- Auzata* Walker, 1862, Cat. Lep. B.M. 26 : 1620.  
*Auzata* Walker, Cotes and Swinhoe, 1887, Cat. Moths India p. 186.  
*Auzata* Walker, Kirby, 1892, Syn. Cat. Lep. Het. p. 735.  
*Auzata* Walker, Hampson, 1893, Fauna Brit. India Moths p. 331.  
*Auzata* Walker, Warren, 1897, Novit. zool. 4 : 13.  
*Auzata* Walker, Leech, 1898, Trans. ent. Soc. Lond. 1898 : 362.  
*Auzata* Walker, Strand, 1911, Gross-Schmetterl. 2 : 197.  
*Auzata* Walker, Warren, 1922, Gross-Schmetterl. 10 : 446.  
*Auzata* Walker, Gaede, 1931, Lepid. Cat. 49 : 4-5.  
*Gonocilix* Warren, 1896, Novit. zool. 3 : 337. Type by original designation and monotypy *Gonocilix ocellata* Warren.  
*Argyris* Guenée (pro parte), Butler, 1878, III. Lep. Brit. Mus. 2 : 52.

Type species: *Auzata semipavonaria* Walker, by monotypy.

Male Proboscis well developed. Palp slender, extending dorsally to labrum or some distance above labrum. Antenna closely lamellate; brown, brown and white, or greyish brown dorsally. Head variously marked with brown and white bands.

Thorax white, tegulae densely clothed with long hair-like scales. Legs generally with brownish outer surface and whitish inner surface; mesothoracic leg with one pair of apical spurs; metathoracic leg with two pairs of spurs.

Costal margin of fore wing slightly convex, outer margin convex, angled in some species; apex usually weakly falcate. Venation as in text figures 1, 32, 42, with areole in *minuta* Leech and *ocellata* (Warren), without areole in remaining species. Ground colour of upperside of fore wing white, slightly transparent in *simpliciata* Warren; with semi-transparent patches in *minuta* Leech and *ocellata* (Warren); wing markings greyish brown and brownish orange, usually with double antemedial and postmedial, subterminal, and terminal fasciae (see plate). Hind wing with Sc + R<sub>1</sub> anastomosed with R<sub>s</sub> for some distance distal to end of cell in most species but only approximated to R<sub>s</sub> in *ocellata* (Warren); colour pattern of upperside similar to fore wing. Underside of both wings white, with costal area of fore wing variously irrorated with brown in four of the species; wings white with strongly marked brown areas in *minuta* Leech and *ocellata* (Warren). Frenulum just longer than greatest diameter of eye.

Abdomen whitish, variously marked dorsally and laterally with brown in some species.

Male genitalia. Tegumen and vinculum well developed; saccus small in most species but elongate in *minuta* Leech and with asymmetrical bulge in *ocellata* (Warren). Valve(?) present in *minuta* Leech and *ocellata* (Warren), absent in remaining species. Variously lobed structure (to be termed anellus in this paper) surrounding base of aedeagus in most species.

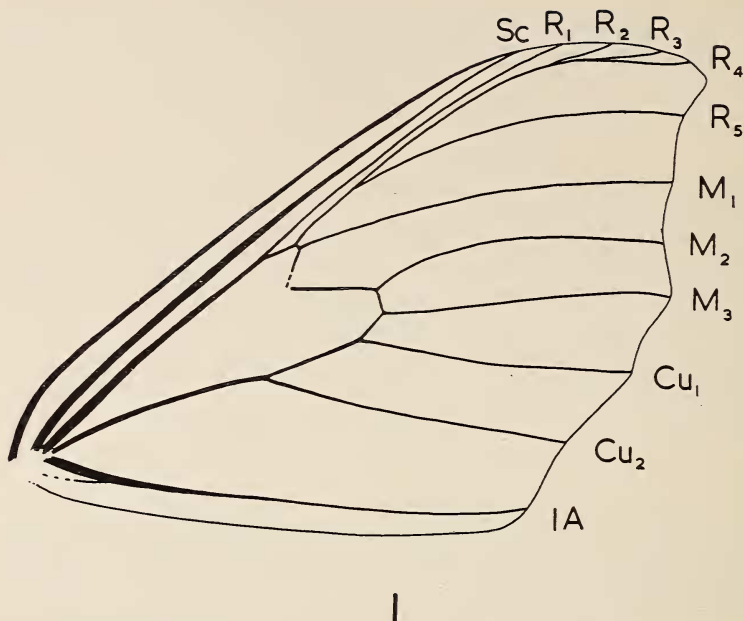


Fig. 1. *Auzata sempivonaria* Walker. Venation of fore wing.

Aedeagus arcuate in *minuta* Leech, short and stout in *ocellata* (Warren) sigmoid in remaining species; vesica without cornutus except in *ocellata* Warren. Uncus bifid or bifurcate posteriorly. Gnathus variously shaped, poorly developed in *chinensis* Leech and *simpliciata* Warren. Various shaped hairy processes situated one on either side of uncus (to be termed *socii* in this paper). Subscaphium present in *minuta* Leech, absent in remaining species. Eighth tergite variously shaped, with paired lateral lobes apparently articulating with medial part in *minuta* Leech and *ocellata* (Warren). Eighth sternite asymmetrical in *ocellata* (Warren), with long apodemes in *minuta* Leech, and with paired lateral lobes which apparently articulate with medial part of sternite in remaining species.

Female. Similar to male but with more slender antennae; and with 7th abdominal sternite not scaled, but usually with numerous setae. Outer margin of wings often less distinctly angled than in male.

Female genitalia. Posterior margin of pre-ostial tergite emarginate in some species. Pre-ostial sternite with conspicuous medial plate in *minuta* Leech and *ocellata* (Warren); posterior margin of sternite concave in remaining species. Bursa copulatrix with single, elongate, longitudinally invaginate signum in *minuta* Leech and *ocellata* (Warren); bursa similar in remaining species but with pair of concave, scobinate signa in addition to elongate signum. Ductus bursae shorter than length of bursa copulatrix in most species; approximately equal to length of bursa in *minuta* Leech, opening at end of everted sclerotised tube; very short in *ocellata* (Warren). Ostial segment variously developed; strongly developed in *ocellata*

(Warren). Anterior and posterior apophyses absent. Single pair of ovipositor lobes.

**Distribution:** The known range of this genus includes North India, China, Korea, Japan, and East Manchuria.

**Remarks.** In certain characters, in particular the male and female genitalia, *Auzata minuta* Leech and *A. ocellata* (Warren) are distinct from the rest of the genus. The male genitalia however do not indicate that the former species are any more closely related to each other than either is to the rest of the genus: because of this and the many common characters shared by all the species, and until further material is available, I have chosen to leave the species *minuta* Leech and *ocellata* (Warren) in the genus *Auzata* Walker.

Key to species and subspecies (males)

- 1 Fore wing and hind wing with one or more semi-transparent patches . . . 2  
Wings without semi-transparent patches . . . . . 4
- 2 Shape and colour pattern of wings as in plate 1, fig. 8 . . . . . 3  
Wings not as above, as in plate 48 b of Gross-Schmetterl. 2 . . . . . *ocellata*
- 3 Male genitalia as in text figs. 34—37 . . . . . *minuta minuta*  
Male genitalia as in text figs. 39—41 . . . . . *minuta spiculata*
- 4 Subterminal fascia present on upperside of fore and hind wing . . . . . 6  
Subterminal fascia absent on both wings . . . . . 5
- 5 Male genitalia as in text figs. 26—29 . . . . . *superba superba*  
Male genitalia as in text fig. 31 . . . . . *superba cristata*
- 6 Colour pattern of wings weakly marked (plate 1, fig. 7); male genitalia as in text figs. 21—24 . . . . . *simpliciata*  
Colour pattern of wings strongly marked; male genitalia not as above . . . 7
- 7 Male genitalia as in text figs. 2—5 . . . . . *semipavonaria*  
Male genitalia not as above . . . . . 8
- 8 Colour pattern of upperside of fore wing as in plate 1, fig. 4 *chinensis arcuata*  
Colour pattern of fore wing not as above . . . . . 9
- 9 Colour pattern of upperside of hind wing as in plate 1, fig. 2;  
male genitalia as in text figs. 7—10 . . . . . *chinensis chinensis*  
Colour pattern of upperside of hind wing as in plate 1, fig. 3,  
male genitalia as in text figs. 12—15 . . . . . *chinensis proluxa*

*Auzata semipavonaria* Walker

*Auzata semipavonaria* Walker, 1862, Cat. Lep. B.M. 26 : 1620.  
*Auzata semipavonaria* Walker, Butler, 1886, Ill. Lep. Brit. Mus. 6 : 18.  
*Auzata semipavonaria* Walker, Cotes and Swinhoe, 1887, Cat. Moths India p. 186.  
*Auzata semipavonaria* Walker, Kirby, 1892, Syn. Cat. Lep. Het. p. 735.  
*Auzata semipavonaria* Walker, Hampson, 1893, Fauna Brit. India Moths p. 331.  
*Auzata semipavonaria* Walker, Strand, Gross-Schmetterl. 2 : 197.  
*Auzata semipavonaria* Walker, Warren, 1922, Gross-Schmetterl. 1 : 446. (Good colour plate).  
*Auzata semipavonaria* Walker, Gaede, 1931, Lepid. Cat. 49 : 5.

Type. Holotype male, Mussoori.

Similar in external appearance to *chinensis* Leech, but differing from all subspecies of the latter in the absence of black scales on the anterior part of the comma-shaped marking on the upperside of the forewing. The male genitalia, including the eighth sternite, readily separate the species.

Male (Plate 1, figure 1). 43.5, 38.0 - 51.2 mm., (10). Greatest width of antenna equal to one-quarter to one-fifth greatest diameter of eye. Palp upcurved, extending to well above labrum. Head dark grey-brown but



with narrow, transverse, white band immediately anterior to antennae, and with broader white band at posterior margin of head. Antennae clothed with white and brown scales dorsally.

Legs whitish, with anterior surface of fore femur and outer surface of tibial and tarsal segments of all legs irrorated with brown except at distal end of each segment. Outer margin of fore wing slightly convex between apex and  $M_3$ , less distinctly convex between  $M_3$  and  $Cu_1$ , and also between tornus and  $Cu_1$ ; apex weakly falcate. Venation of fore wing as in text figure 1. Ground colour of upperside of both wings white; colour of subterminal fascia and all other markings close to OOS/O-14-3<sup>9</sup>, a pale brownish grey. Broad posterior comma-shaped part of postmedial fascia in fore wing pale brownish orange edged anterodistally with dark brown and with both very dark brown and white on  $Cu_2$ .

Upperside of fore wing (see plate 1, figure 1) with trace of anterior part of sub-basal fascia; well marked double antemedial; double post-medial, enlarged medially; dark spot on  $R_5$ ,  $M_1$ , and 1 A immediately distal to postmedial fascia; broad subterminal, absent anterior to  $R_5$ , very faintly marked between  $R_5$  and  $M_1$  and faintly marked between  $M_3$  and  $Cu_1$ ; terminal fascia well marked from tornus to near apex; fringe of outer margin white, tipped with dark brown, and with central narrow band of dark brown parallel to margin, except at end of veins where fringe is entirely white. Outer margin of hind wing similar in shape to that of fore wing but more strongly angled at  $M_3$  and  $Cu_1$ . Sc anastomosed with  $R_s$  distal to cell for distance equal to about one-third greatest length of cell. Upperside of hind wing with double antemedial; double post-medial; dark brown spot on veins  $M_2$  to 1 A immediately distal to post-medial, and similarly placed but less distinct spot on  $M_1$ ; faint greyish band joining spots on  $M_2$ ,  $M_3$ , and  $Cu_1$ ; subterminal and terminal fascia similar in form to corresponding fasciae in fore wing; fringe as for fore wing.

Underside of both wings white, but costal area and base of cell of fore wing lightly irrorated basally with dark brown, and with markings of upperside showing faintly through wing. Fringe as for upperside. Frenulum just longer than greatest diameter of eye.

1st abdominal segment white. Segments 2 to 5 brown dorsally, irrorated with white scales especially along mid-dorsal line, and with white posterior fringe to each segment. The latter segments each with slightly oblique, dark brown stripe immediately lateral to brown dorsal area and immediately medial to a strongly marked dark brown ring of scales. Segments 6 to 8 with pair of brown dorsal patches, without oblique lateral stripes but with (except for segment 8) lateral rings. Ventral surface of segments posterior to 1st, white or whitish brown.

Male genitalia (Text figures 2-5). Tegumen and vinculum moderately well developed; saccus short. Arms of uncus arcuate, widely separated from each other. Socii as in figure. Gnathus well developed, each arm tapered and apically free. Anellus as in figure. Aedeagus as in text

figure 4. 8th tergite rounded posteriorly (text figure 3), 8th sternite (text figure 5) with small lobe at posterolateral corners distinct from main body of sternite.

Female. 47.9, 45.2-51.4 mm., (10). Similar to male but with following differences. Greatest width of antenna equal to about one-fifth greatest diameter of eye. Outer margin of fore wing usually less distinctly angled at  $M_3$  and  $Cu_1$ . 6th abdominal segment sometimes entirely dark brown dorsally; 7th sternite not scaled, but with numerous short setae.

Female genitalia (Text figure 6). Anterior margin of pre-ostial sternite concave; surface of sternite with numerous short, stout setae postero-medially. Bursa copulatrix with single, elongate, longitudinally invaginate ventral signum, and pair of elongate, invaginate, scobinate signa. Anterior part of ductus bursae partially sclerotised; ostium opening into sclerotised invagination of ostial segment. Ostial segment produced for short distance posteriorly dorsal to base of ovipositor lobes. Ovipositor lobes well developed.

#### Distribution: North India.

Material examined. British Museum (Nat. Hist.). INDIA: 1 ♀, Sikkim, (O. Möller); 1 ♂, Sultanpur, 1888; 1 ♂, 2 ♀, Mussoorie, (S. Robson), Sept. 16, (H. D. Peile); 1 ♀, Simla, 7000ft., (A. E. Jones); 1 ♀, Simla, 1st. April 1896; 4 ♂, 2 ♀, Sabathu, vi-vii. 1888, vi 1889, 1889; 1 ♂, Sultanpur; 2 ♂, 3 ♀, Punjab, Murree Hills; 1 ♀, Kulu; 1 ♂, 3 ♀, Punjab, Khyra Gully, road to Rawalpindi, 1-10. x. 1881; 1 ♀, Bhowali.

#### *Auzata chinensis chinensis* Leech

*Auzata chinensis* Leech, 1898, Trans. R. ent. Soc. Lond. 1898: 362  
*Auzata chinensis* Leech, Strand, 1911, Gross-Schmetterl. 2 : 197.  
*Auzata chinensis* Leech, Draeseke, 1926, Dtsch. ent. Z. 40 : 99.  
*Auzata chinensis* Leech, Gaede, 1931, Lepid. Cat. 49 : 4.

Type. Syntype male, Kwei-chow, June and July 1890; syntype female, Omei-Shan, 3620 ft., July 1890: Drepanidae genitalia slides No. 535 and No. 534 respectively.

The subspecies can be most easily distinguished from the remaining subspecies by the darker, more strongly marked postmedial of the hind wing (see plate).

For the diagnosis of the species see *semipavonaria* Walker.

Male (Plate 1, figure 2). 42.3, 33.2-52.2 mm., (20). Similar to *semipavonaria* Walker, but with following differences. Palp much shorter, extending to just above labrum. Outer margin of fore wing only weakly angled at  $M_3$  and  $Cu_1$ .  $M_1$  in fore wing nearly always arising short distance posterior to  $R_5$ , not from same point on cell. Posterior comma-shaped part of postmedial fascia on upperside of fore wing differently shaped, with dark distal markings as well as white markings on vein  $M_3$  and  $Cu_1$ ; subterminal broader, indented inwards between  $M_1$  and  $M_3$ . Postmedial of hind wing much more strongly marked posteriorly, and similar in colour to corresponding part of this fascia in fore wing. Subterminal broader. Abdominal segments 2 to 5, and sometimes 6, pale brownish-grey dorsally; rest of abdomen whitish.

Male genitalia (Text figures 7-10). Tegumen concave dorsomedially, anterior margin strongly concave medially. Vinculum and saccus well developed. Uncus laterally flattened, bifurcate. Socius with stout, dentate posterior process (there is some individual variation in the size of the teeth). Anellus strongly developed. Anal tube weakly sclerotised ventrally. Aedeagus (text figure 8) oval in cross-section, sigmoid; vesica minutely scobinate. 8th tergite (text figure 9) with teeth of posterior margin sometimes irregular in shape, and margin not bilaterally symmetrical. 8th sternite (text figure 10) with posterior margin of medial part usually irregular in shape.

Female. 44.3, 37.2-50.8 mm., (20). As for male but antennae more slender, and 7th abdominal sternite setose, not scaled (cf. female *semipavonaria* Walker). Outer margin of hind wing often less strongly angled at  $M_3$  than in male.

Female genitalia (Text figure 11). Pre-ostial tergite bilobed posteriorly. Pre-ostial sternite produced posteriorly on either side; setae as in *semipavonaria* Walker. Ornamentation of bursa copulatrix similar to *semipavonaria* Walker. Ductus bursae short, sclerotised. Ostial segment well developed ventrally, forming sclerotised invagination into which ductus bursae opens. Ovipositor lobes well developed.

Material examined. British Museum (Nat. Hist.). CHINA: 1 ♂, Hunan, (Pratt); 1 ♀, Ta-Chien-Lu, 8300ft., July 1890, (Pratt); 1 ♂, 2 ♀, Ta-tsien-lou, 1893, 1896, 1910; 7 ♂, 9 ♀, Siao-Lou, 1893-1902; 11♂, 19 ♀, Kwansien, July-August, 1920-1930, (G. M. Franck, *et al*); 1 ♀, Chia-Ting-Fu, 1000ft., July 1889, (A. E. Pratt); 1 ♀, Szechwan, Kunkala-Schan; 1 ♂, 2 ♀, Mou-Pin, 1897-1899; 1 ♀, Tay-Tou-Ho, 1896; 2 ♀, China; 1 ♂, Upper Yang-tse-kiang; 2 ♂, with same data as male syntype; 1 ♂, 2 ♀, Tien-Tsuen, Yuin-kin, 1899; 3 ♂, Tien-Tsuen, 1897-1901. TIBET (?): 2 ♀, Frontière Orientale du Thibet; 2 ♀, Thibet, 1892.

#### *Auzata chinensis prolixa* ssp. n.

Type. Holotype male, Chekiang, West-Tien-Mu-Shan, 1600 m., 25. 7. 1932, H. Höne. In Museum Koenig, Bonn.

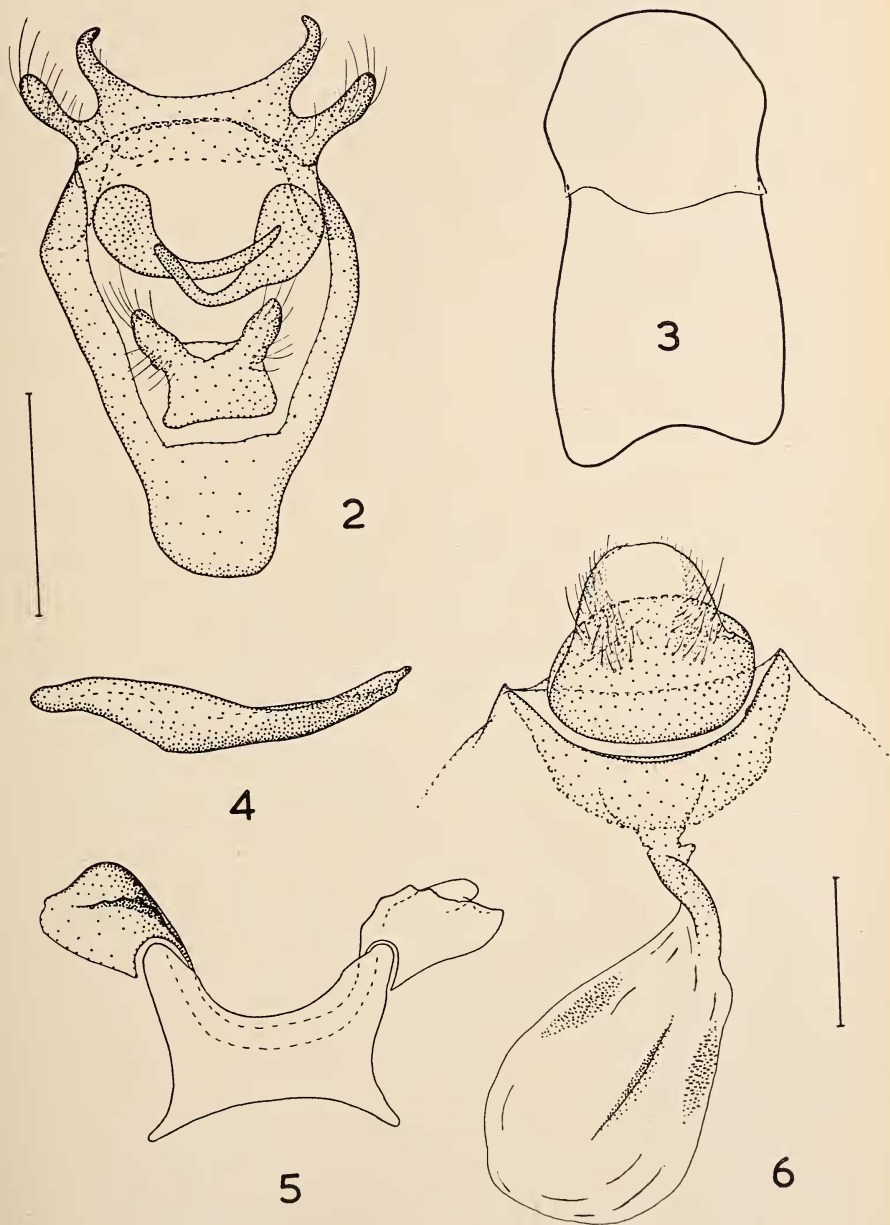
Male (Plate 1, figure 3). 37.9, 30.2-48.0 mm., (7). As for nominate race, but with following differences.

Distal part of postmedial of hind wing much less strongly developed, similar to corresponding fascia of *semipavonaria* Walker but with darker neural spots and with orange-brown connecting band.

Male genitalia (Text figures 12-15). Anellus more strongly sclerotised and differently shaped. Uncus much longer. Eighth tergite (text figure 15) less strongly dentate posteriorly.

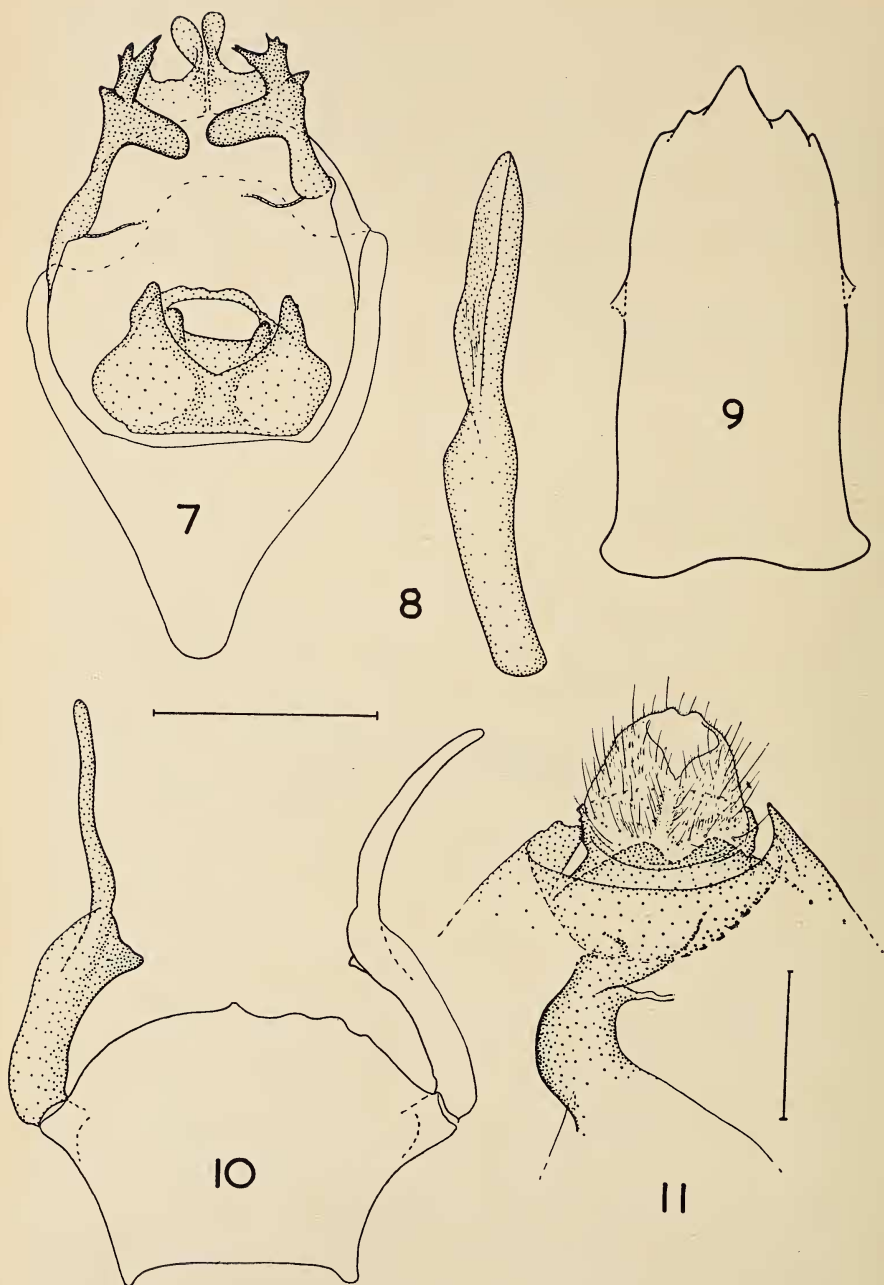
Female. 46.2, 36.6-59.0 mm., (10). Similar to female of nominate race but with same differentiating external characters as male (see above).

Female genitalia (Text figure 16). As for nominate race but with following differences. Ductus bursae longer. Ostium with inwardly produced lateral lips. Ostial segment (?) forming strongly sclerotised, rugose collar at base of ovipositor lobes. Ovipositor lobes differently shaped ventrally at base.

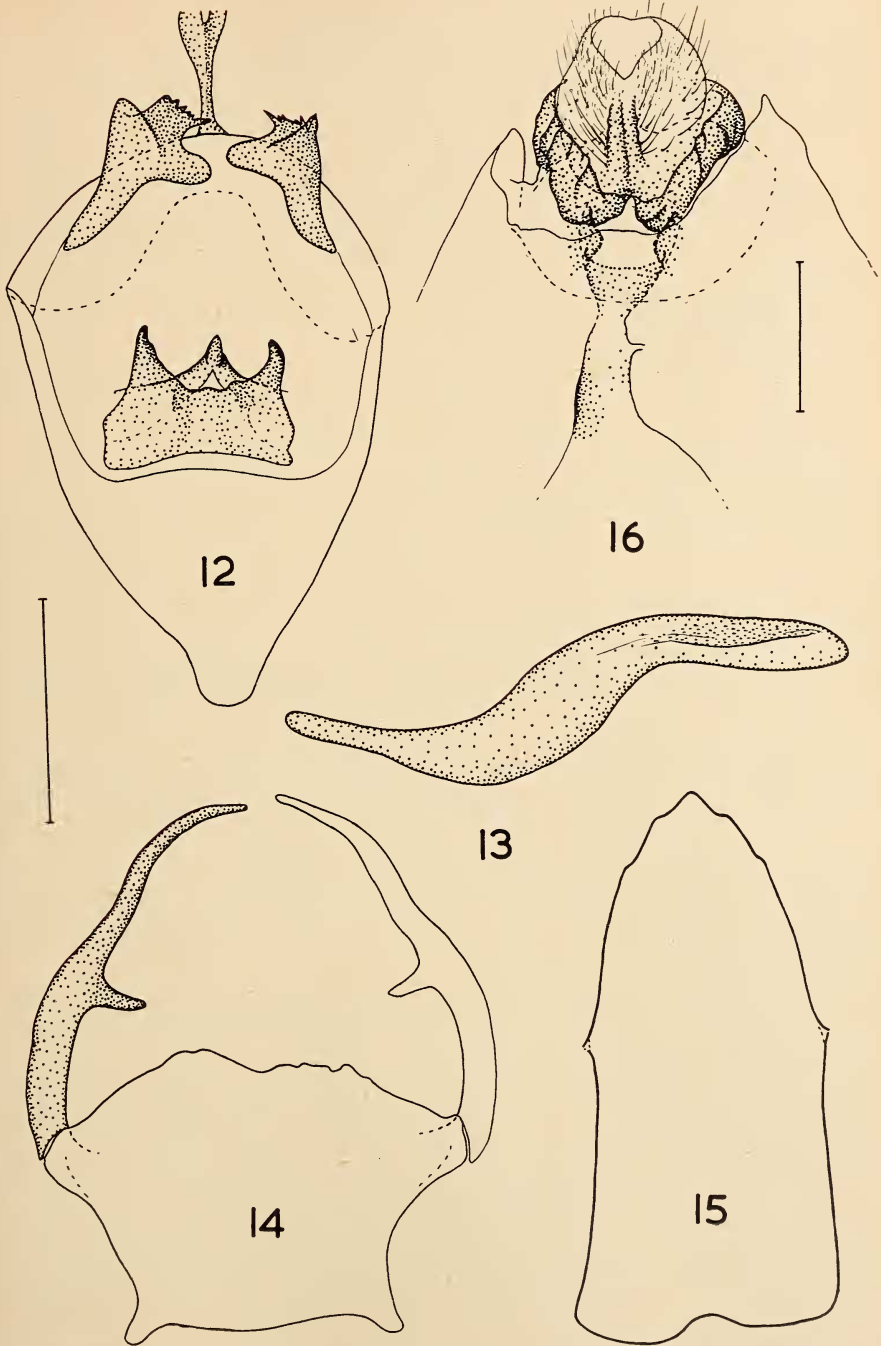


Figs. 2—6. *Auzata sempivonaria* Walker. Male holotype: 2, body of genitalia; 3, eighth abdominal tergite; 4, aedeagus; 5, eighth abdominal sternite; 6, Female genitalia.

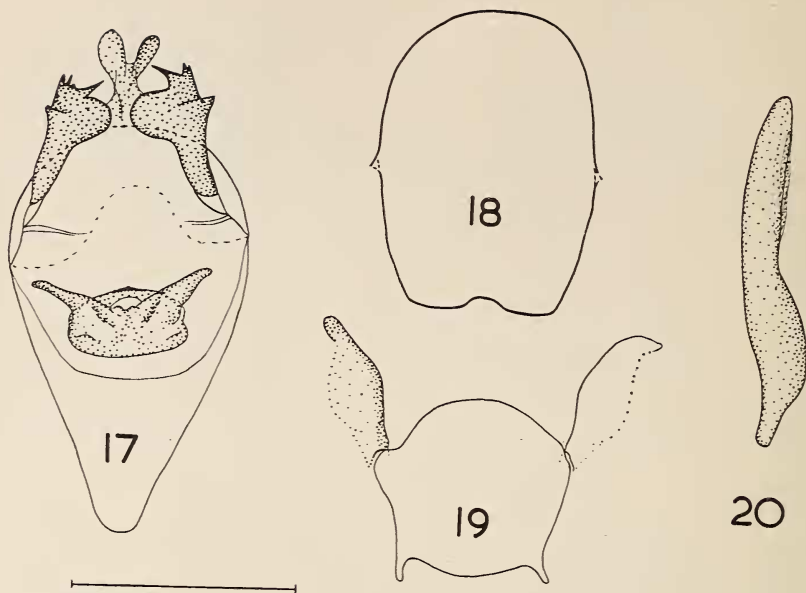




Figs. 7—11. *Auzata chinensis chinensis* Leech. Male: 7, body of genitalia; 8, aedeagus; 9, eighth abdominal tergite; 10, eighth abdominal sternite. 11, Female genitalia.



Figs. 12—16. *Auzata chinensis prolixa* ssp. n. Male: 12, body of genitalia; 13, aedeagus; 14, eighth abdominal sternite; 15, eighth abdominal tergite; 16, Female genitalia.



Figs. 17—20. *Auzata chinensis arcuata* ssp. n. Male holotype: 17, body of genitalia; 18, eighth abdominal tergite; 19, eighth abdominal sternite; 20, aedeagus.

Material examined. Museum Koenig, Bonn. CHINA: 5 ♂, 10 ♀ (including allotype ♀), from type locality, 4. vi. - 2. x. 1932, (H. Höne); 1 ♀, Chekiang, Ost Tienmu-shan, 22. v. 1931, (H. Höne; 1 ♂, Chekiang, Mokanshan, (H. Höne).

*Auzata chinensis arcuata* ssp. n.

Type. Holotype male, China, Sued-Shensi, Tapaishan im Tsingling, ca. 3000 m., 25. 8. 1936. H. Höne: Drepanidae genitalia slide No. 538. In Museum Koenig, Bonn.

Easily distinguished from the other subspecies by the form of the comma-shaped marking on the upperside of the fore wing (see plate).

Male. 40.2, 36.0 - 42.6 mm., (9). As for nominate race, but with comma-shaped part of postmedial on upperside of fore wing more strongly arcuate, and dark neural spots larger but usually more diffusely marked; subterminal fascia less broad. Upperside of hind wing as for *prolixa* ssp. n.

Male genitalia (Text figures 17-20). As for nominate race but with following differences. Anellus with longer lateral lobes; socius differently shaped; posterior margin of 8th tergite (text figure 18) not dentate; 8th sternite quite distinctive (text figure 19); aedeagus differently shaped (text figure 20).

Female (Plate 1, figure 4). 45.5, 41.4 - 48.2 mm., (5). As for female of nominate race but with same differentiating characters as those listed above for the male.

Female genitalia. Very similar to nominate race.

Material examined. Museum Koenig, Bonn. CHINA: 2 ♀ (including allotype ♀), from type locality, 2fl. vi. - 20. vii. 1935, 27. vi. - 25. viii. 1936, (H. Höne) British Museum (Nat. Hist.). CHINA: 1 ♂, 3 ♀, Tu-Pa-Keo, 7400ft., 3-7. ix. 1929.

*Auzata simplicciata* Warren

*Auzata simplicciata* Warren, Novit. zool. 4 : 13.

*Auzata simplicciata* Warren, Hampson, 1897, J. Bombay nat. Hist. Soc. 11 : 287.

*Auzata simplicciata* Warren, Warren, 1922, Gross-Schmetterl. 10 : 446.

*Auzata simplicciata* Warren, Gaede, 1931, Lepid. Cat. 49 : 5.

Type. Holotype male, Khasis, May, 1896: Drepanidae genitalia slide No. 557.

Distinguished at once from the rest of the genus by the faintly marked colour pattern of the wings (see plate).

Male (Plate 1, figure 7). 37.6, 34.6 - 42.0 mm., (5). Palp extending to labrum or just beyond labrum; colour as in *semipavonaria* Walker. Antenna white dorsally at base, irrorated with dark brown distally; shape as in preceding species. Head white, with broad, transverse, dark brown band immediately anterior to antennae.

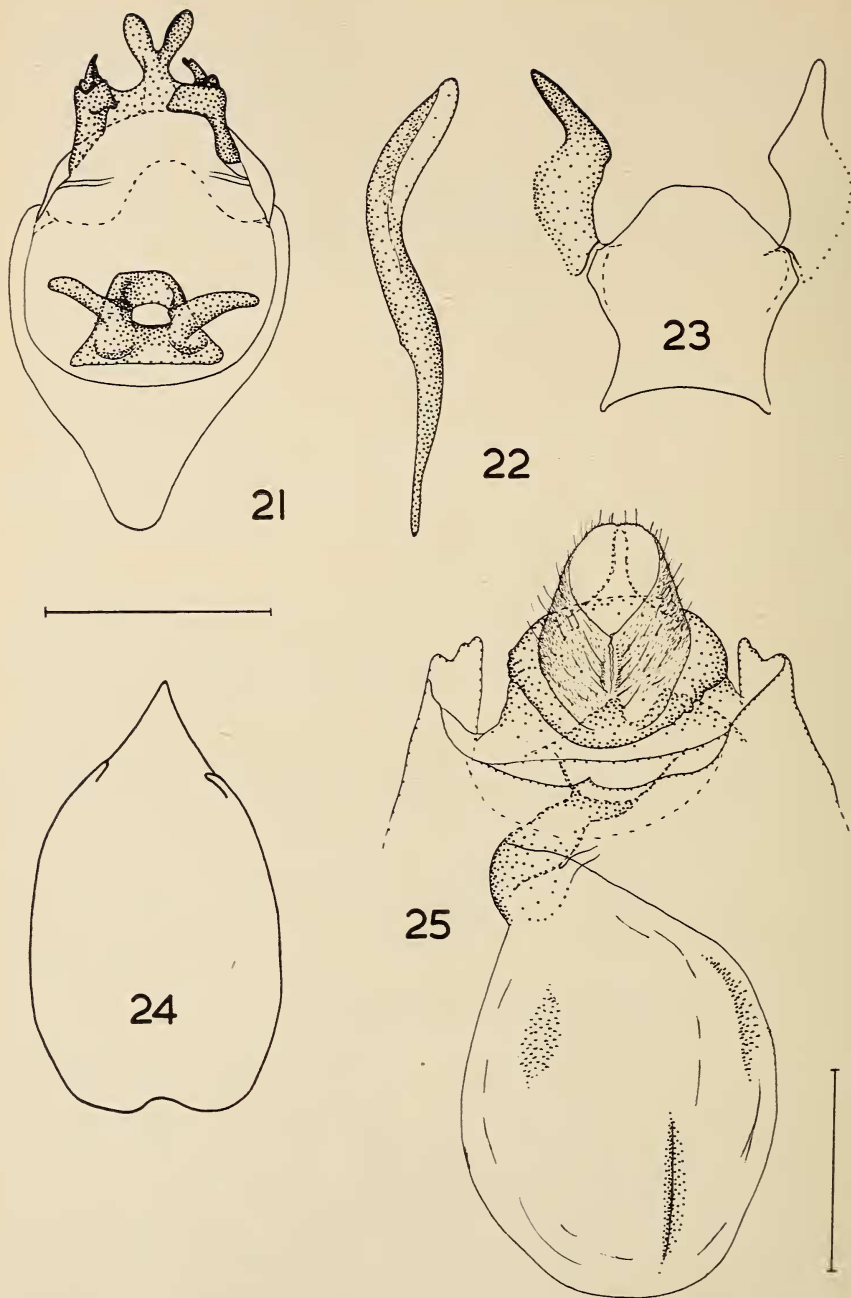
Thorax white. Mesothoracic and metathoracic legs white; prothoracic legs as in *semipavonaria* Walker. Costal margin of fore wing slightly convex; outer margin not angled at middle; apex sometimes very weakly falcate; venation as in *chinensis* Butler. Ground colour of upperside of both wings white, slightly transparent. Fore wing with weakly marked, brown, double antemedial, double postmedial, subterminal and terminal fascias; oblique row of neural dots immediately distal to postmedial fasciae, most strongly marked on M<sub>3</sub>. Fringe white, sometimes with brown transverse band. Hind wing weakly angled at M<sub>3</sub>. Venation as in *chinensis* Butler. Hind wing with trace of double postmedial, more strongly marked proximal postmedial line, and trace of distal postmedial line, subterminal and terminal fasciae. Row of five neural spots between postmedial and subterminal, most strongly marked at M<sub>3</sub>. Fringe as for fore wing. Under-side as in *semipavonaria* Walker. Abdomen white.

Male genitalia (Text figures 21-24). Tegumen slightly concave dorso-medially, anterior margin strongly concave medially. Vinculum and saccus well developed. Uncus short, bifurcate. Lateral arms of gnathus narrow, minutely scobinate. Socii bifurcate. Anellus as in figure. Aedeagus (text figure 22) evenly rounded apically. 8th tergite (text figure 24) acuminate posteriorly. 8th sternite as in text figure 23.

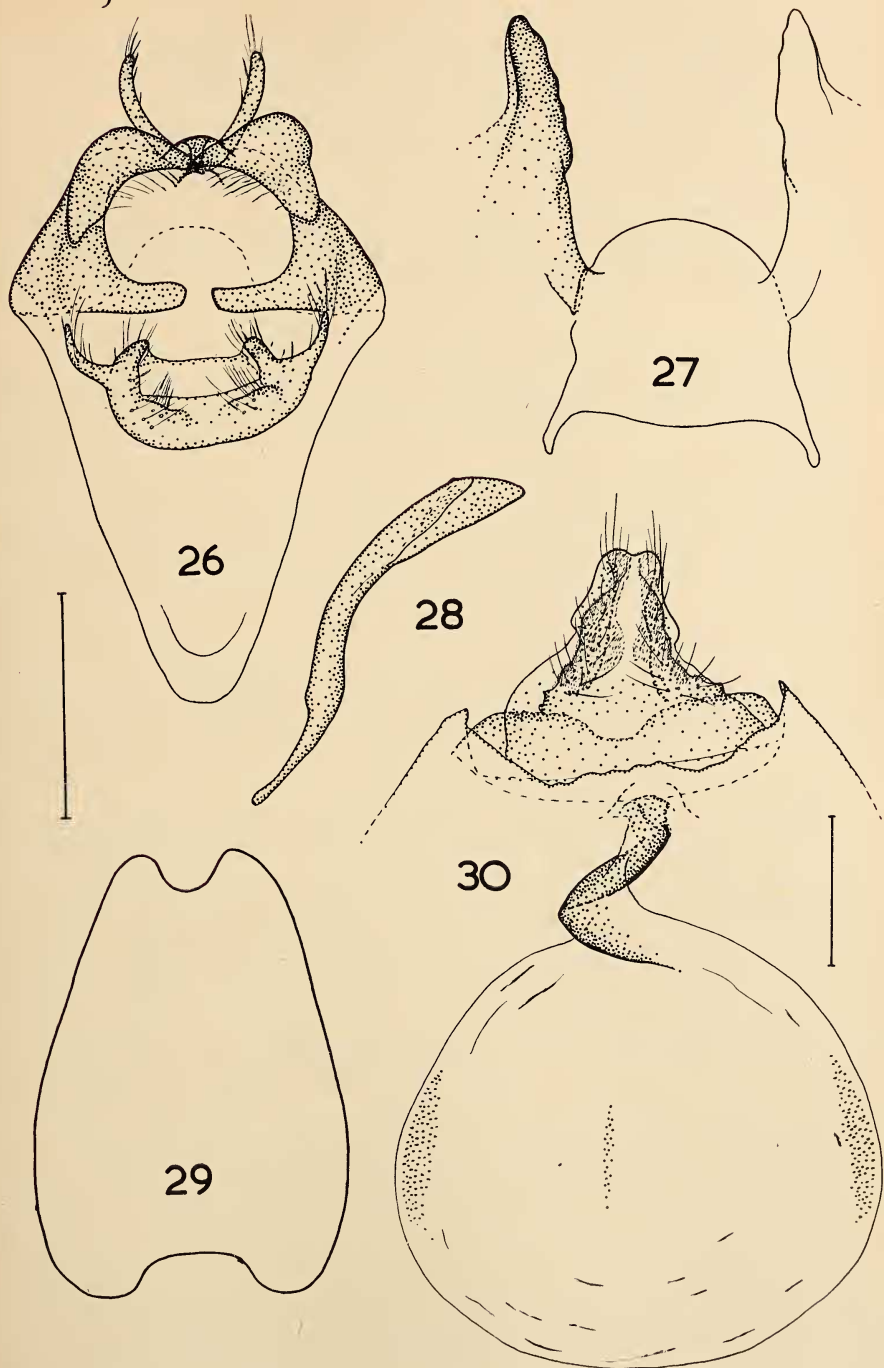
Female (Plate 1, figure 7). 41.2, 38.4 - 43.6 mm., (10). As for male but shape of antenna as in female *semipavonaria* Walker, and 7th abdominal sternite setose, not scaled (cf. latter species).

Female genitalia (Text figure 25). Posterior margin of pre-ostial tergite bilobed medially; posterior margin of pre-ostial sternite irregular, posterolateral corners produced posteriorly. Bursa copulatrix with single, ventral,





Figs. 21—25. *Auzata simplicata* Warren. Male: 21, body of genitalia; 22, aedeagus; 23, eighth sternite; 24, eighth tergite; 25, Female genitalia.



Figs. 26—30. *Auzata superba superba* Butler. Male: 26, body of genitalia; 27, eighth abdominal sternite; 28, aedeagus; 29, eighth abdominal tergite; 30, Female genitalia.

elongate, longitudinally invaginate signum, and pair of concave, scobinate signa. Ductus bursae bent to left near bursa copulatrix. Ostial segment narrow anteroposteriorly. Ovipositor lobes as in figure.

**Distribution:** This species extends from Assam in northern India to northern Yunnan, China, apparently without any subspeciation.

Material examined. British Museum (Nat. Hist.). N. INDIA: 1 ♂, with same data as holotype; 1 ♀, Mussoorie, 2. vi. 1917, (H. D. Piele); 1 ♀, Naini Tal, Kala Khan, 6300ft., 1. iii. 1934, (J. A. Graham); 2 ♀, Darjeeling, Gopaldhara, 4720ft., (H. Stevens). Museum Koenig. CHINA: 2 ♂, 9 ♀, Nord-Yunnan, Li-kiang, 10. viii., 2. ix. 1935, 28. viii. - 25. viii. 1934, (H. Höne).

*Auzata superba superba* (Butler)

*Argyris superba* Butler, 1878, Ill., Lep. Brit. Mus. 2 : 52.

*Auzata superba* (Butler), Kirby, 1892, Syn. Cat. Lep. Het. p. 735.

*Auzata superba* (Butler), Leech, 1898, Trans. R. ent. Soc. Lond. 1898 : 362.

*Auzata superba* (Butler), Strand, 1911, Gross-Schmetterl., 2 : 197. (Good colour-plate).

*Auzata superba* (Butler), Gaede, 1931, Lepid. Cat. 49 : 5.

*Auzata superba* (Butler), Matsumura, 1931, 6000 Ill. Ins. Japan p. 739.

*Auzata superba* (Butler), Esaki *et al*, 1932, Icon Ins. Japon p. 1347. (1st ed.).

*Auzata superba* (Butler), Esaki *et al*, 1953, Icon Ins. Japon p. 567. (2nd ed.).

*Auzata superba* (Butler), Takeuchi, 1955, Coloured Illustrations of the Insects of Japan p. 97.

*Auzata superba* (Butler), Inoue, 1956, Check List Lep. Japan p. 366.

Type. Holotype female, Japan.

The species *superba* (Butler) is most easily distinguished from *semipavonaria* Walker and *chinensis* Leech by the absence of a terminal fascia on the upperside of both wings and by the poorly developed antemedial fascia on the fore wing.

Male (Plate 1, figure 5). 38.9, 32.8 - 54.6 mm., (50). Head, head appendages, thorax, legs, and abdomen as for *chinensis* Leech, but with greatest width of antenna equal to about one-third greatest diameter of eye. Costal margin of fore wing slightly convex; outer margin evenly convex; apex sometimes weakly falcate. Vein  $R_3$  usually arising from a point closer to cell than in *semipavonaria* Walker and with  $M_1$  arising short distance posterior to stalk of  $R_s$  as in *chinensis* Leech. Colour of wings as for two preceding species, but with white ground colour more opaque. Antemedial fascia represented by large costal spot, diffuse spot at inner margin, and sometimes by marking between  $Cu_2$  and 1A. Postmedial represented by costal spot, pair of oblique dashes between  $R_4$  and  $R_5$ , and between  $R_5$  and  $M_1$ , and by enlarged comma-shaped area as in preceding species. Subterminal usually only present between  $M_1$  and  $M_3$ , and between  $Cu_1$  and tornus; sometimes with faint marking between  $R_5$  and  $M_1$ , and between  $M_3$  and  $Cu_1$ . Terminal fascia absent, but wing sometimes with narrow, brown, marginal band. Fringe usually white anteriorly, brown near tornus; sometimes with brown basal band interrupted at veins. Hind wing not angled at middle. Sc and  $R_s$  fused for shorter distance after end of cell than in preceding species: length of anastomosis usually equal to much less than one-third greatest length of cell. Upperside of hind wing with well marked distal antemedial line

and trace of proximal antemedial line; postmedial fascia similar in shape to that *chinensis prolixa* ssp. n.; subterminal interrupted between  $M_3$  and  $Cu_1$ ; terminal fascia absent; but sometimes with narrow brown marginal band; fringe as in fore wing. Underside of both wings as for preceding species, but with base of costal area and cell in fore wing more strongly irrorated with dark brown.

First abdominal segment entirely white; segments 2 to 7 usually irrorated dorsally with brown except along mid-dorsal line and at posterior margin of each segment. Abdomen whitish ventrally.

Male genitalia (Text figures 26-29). Tegumen and vinculum well developed. Lateral margin of saccus continuous with that of vinculum. Uncus bifid. Arms of gnathus well developed, minutely scobinate. Socii large, pointed, inwardly directed. Heavily sclerotised structure (scaphium?) immediately ventral to base of uncus, invaginate dorsally and with shallow ventral concavity. Anellus as in figure. Aedeagus (text figure 28) sigmoid, tapered to point apically; vesica minutely scobinate. 8th tergite (text figure 29) emarginate posteriorly. 8th sternite (text figure 27) with pair of large posterior lobes which apparently articulate with the main part of sternite.

Female. 47.7, 377.2-57.2 mm., (50). Similar to male but with greatest width of antenna equal to about one-quarter greatest diameter of eye. and 7th abdominal sternite setose, not scaled, as in female *semipavonaria* Walker.

Female genitalia (Text figure 30). Posterior margin of pre-ostial segment irregular; posterolateral corners produced posteriorly for short distance. Bursa copulatrix with pair of concave, scobinate signa, and single, elongate, ventral signum (the latter may be very weakly developed or absent). Ductus bursae sclerotised posteriorly, bent to right just before ostium. Ostial segment moderately well developed. Ovipositor lobes as in figure.

**Distribution:** Found in most parts of Japan, and probably in Russia (Ussuri) and Quelpart I. (see below).

Material examined. British Museum (Nat. Hist.). JAPAN: 1 ♂, 2 ♀, Hokkaido; 7 ♂, 7 ♀, Hakodate, August 1886, (Leech), June and July 1887; 2 ♂, Yezo; 5 ♂, 6 ♀, Yokohama, 10. vi. - 3. vii. 1896; 3 ♂, 2 ♀, Yokohama 1886, (Manley), Sept. 1889, (Dr. Fritze), June 1888; 30 ♂, 4 ♂, Takao-san, 60 km. W. of Tokyo, 14 June 1925-7 July 1926, (M. Aigner); 1 ♂, Tokyo, 1891 (Dr. Fritze); 1 ♂, Tamagawa, W. of Tokyo, 25 June 1926, (M. Aigner); 2 ♂, 3 ♀, Nikko; 4 ♂, 1 ♀, Nikko, October, November 1925, (M. Aigner); 5 ♀, Honshu, prov. Musashi, Bukenji, 20. v. 1894-9. vi. 1895, (A. E. Wileman); 1 ♀, Toshima, Junsai, Aug. 1902, (A. E. Wileman); 1 ♀, Yamato, June 1899, (A. E. Wileman); 1 ♀, Shikoku, 1894, (Chasseurs indigènes); 1 ♀, Nowata, 22. vi. 1880; 1 ♀, Kyushu, prov. Hyuga, Shimo-Shiiba, 8. vii. 1893, (A. E. Wileman); 18 ♂, 19 ♀, Japan. Museum Koenig. JAPAN: Choji am Fuji, (Höne).

One male (without abdomen) and one female from Quelpart In. and Ussuri respectively may belong to this subspecies.



*Auzata superba cristata* ssp. n.

Type. Holotype male, Prov. Shansi, Mien-shan, 30. 7. 1937, H. Höne: Drepanidae genitalia slide No. 555. In Museum Koenig, Bonn.

Male (Plate 1, figure 6). 39.3, 36.2-43.8 mm., (3). As for nominate race but with following differences. All markings of upperside of fore wing less strongly marked; comma-shaped part of postmedial less broad. Upperside of hind wing with postmedial lines finer, and brownish orange scales between tornus and postmedial as in some specimens of nominate race.

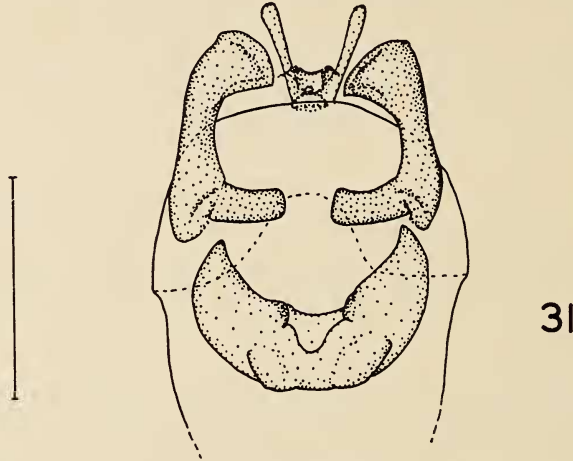


Fig. 31. *Auzata superba cristata* ssp. n. Body of male genitalia.

Male genitalia (Text figure 31). As for nominate race but with following differences. Socius strongly carinate posteriorly and differently shaped. Scaphium (?) of different shape, with only small dorsal invagination. Anellus as in figure. Aedeagus rounded apically. Posterior margin of 8th tergite entire or only weakly emarginate medially.

Female. Not known.

Material examined. Museum Koenig, Bonn. CHINA: 1 ♂, from type locality, 11. vii. 1937, (H. Höne); 1 ♂, Chekiang, West Tien-Mu-Shan, 1600 m, 26. vi. 1932, (H. Höne).

Three females from Tapaishan im Tsingling (China, S. Shensi) may also belong to this subspecies.

*Auzata minuta minuta* Leech

*Auzata minuta* Leech, 1898, Trans. R. ent. Soc. Lond. 1898 : 362.

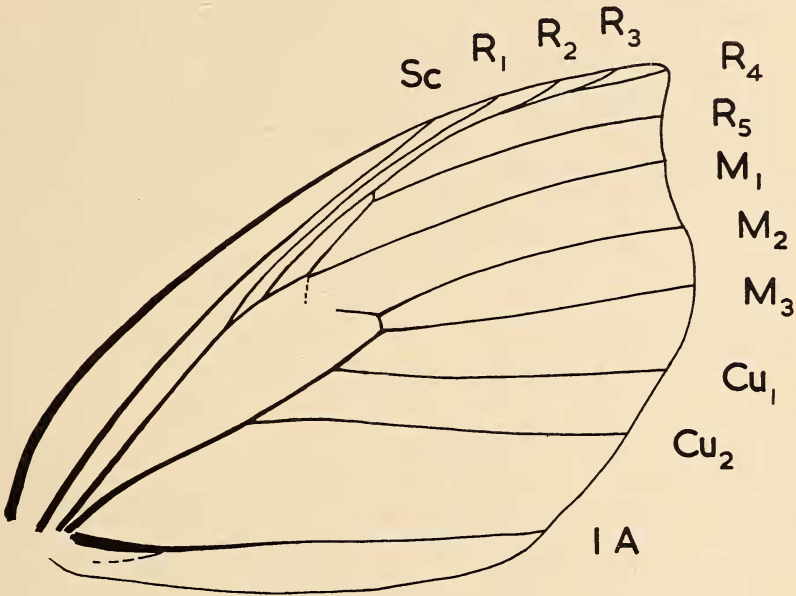
*Auzata minuta* Leech, Strand, 1911, Gross-Schmetterl. 2 : 197

*Auzata minuta* Leech, Gaede, 1931, Lepid. Cat. 49 : 5.

Type. One male and one female syntype, Ichang, July 1888: Drepanidae genitalia slides No. 571 and No. 572 respectively.

The species *minuta* Leech is distinguished from (*ocellata*) Warren by the weakly angled outer margin of fore and hind wing and the colour pattern of the upperside of the wings. It is separated from the rest of the genus by the presence of semi-transparent patches in the wings.

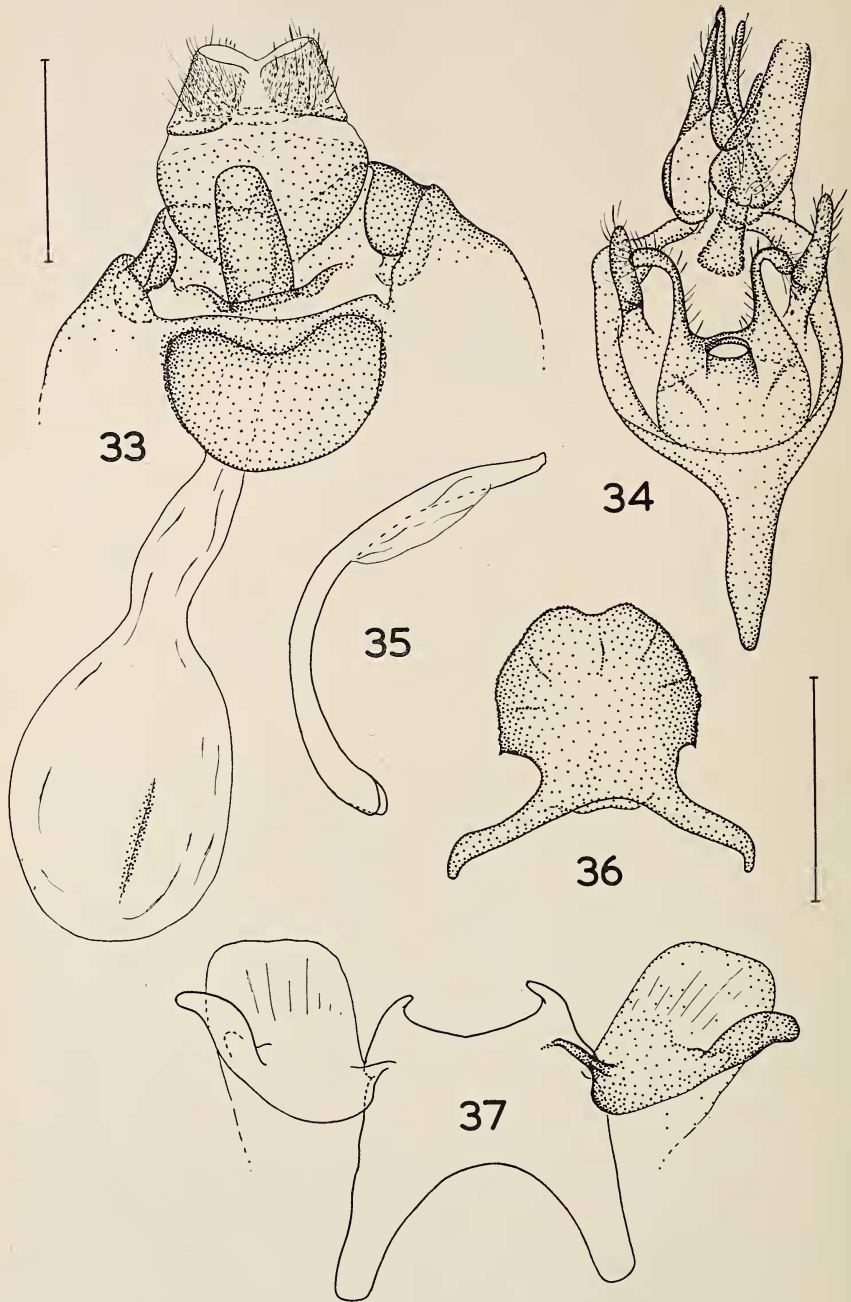
Male. 25.0, 23.2 - 26.8 mm., (10). Palp extending upwards to margin of labrum. Antennal width as for *semipavonaria* Walker; upper surface of shaft brown, Head brown, posterior margin white.



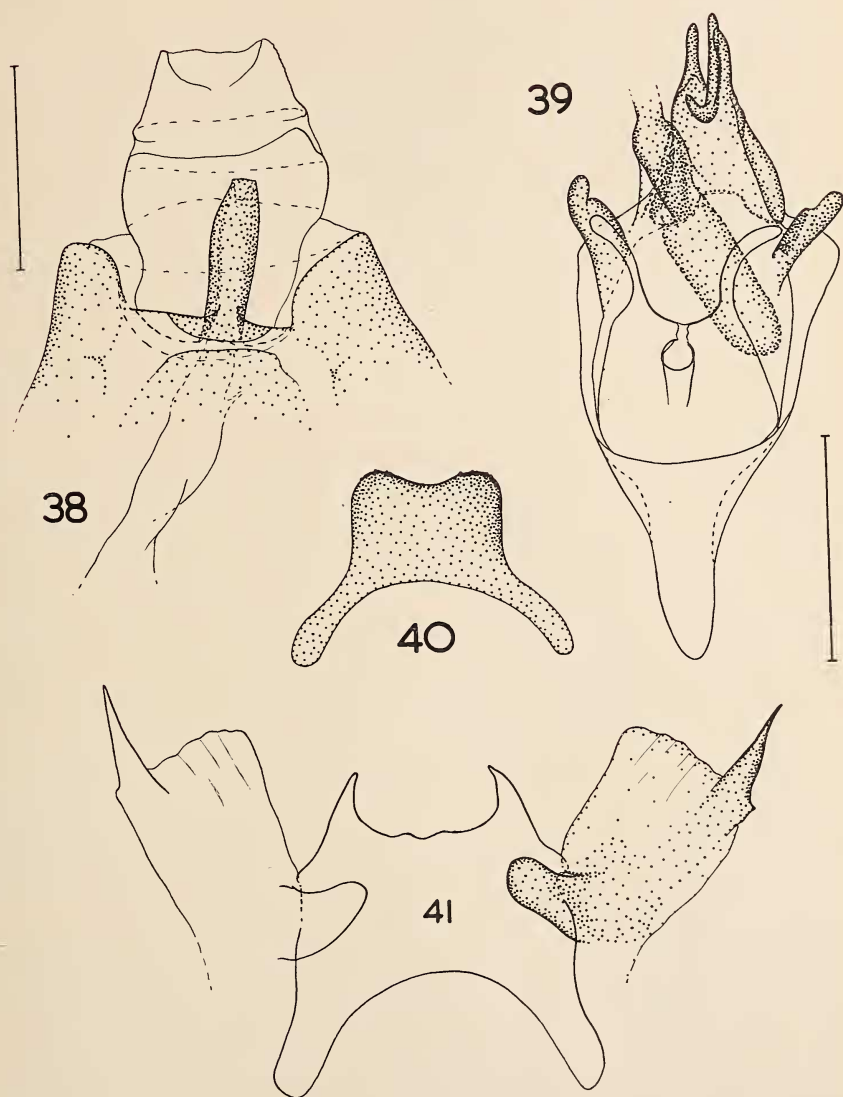
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Fig. 32. *Auzata minuta minuta* Leech. Venation of fore wing.

Thorax white dorsally, brownish white ventrally. Outer surface of legs greyish brown, inner surface brownish white. Costal margin and outer margin of fore wing moderately convex; apex slightly falcate; venation as in text figure 32. Upperside of both wings white. (Wing markings grey-brown unless otherwise stated.) Fore wing sometimes with trace of double antemedial; postmedial well developed, with comma-shaped part strongly arcuate and irrorated with orange-coloured scales; small orange spot at posterior angle of cell (posterodistal spot, see Watson 1956) and larger but similarly coloured spot edged proximally with brown on anterior part of discocellular vein; weakly marked subterminal usually interrupted between  $M_3$  and  $Cu_1$  and absent anterior to  $M_1$ , lightly irrorated with orange posteriorly. Strongly marked terminal fascia of inter-neural dashes. Fringe white with central brown band parallel to outer margin. Wing with semi-transparent patch between  $M_2$  and  $M_3$  immediately proximal to subterminal fascia; similar but elongate patch near apex between  $R_4$  and  $R_5$ , and similar patch between  $R_5$  and  $M_1$ . Outer margin of hind wing sometimes weakly angled at  $M_3$ . Sc anastomosed with Rs



Figs. 33—37. *Auzata minuta minuta* Leech. 33, Female genitalia. Male genitalia: 34, body of genitalia; 35, aedeagus; 36, eighth abdominal sternite; 37, eighth abdominal tergite.



Figs. 38—41. *Auzata minuta spiculata* ssp. n. 38, Female genitalia. Male genitalia: 39, body of genitalia; 40, eighth abdominal sternite; 41, eighth abdominal tergite.



distal to cell for distance equal to slightly less than one-half greatest length of cell. Hind wing with trace of double antemedial fascia; strongly marked double postmedial fascia; broad subterminal fascia; terminal fascia and fringe as in fore wing. Area between  $M_3$  and 1 A, bordered laterally by postmedial and subterminal, semi-transparent; sometimes with small transparent patch between anal margin and 1 A posterior to former area. Underside of fore wing with distal three-quarters of costal area pale yellowish brown; rest of fore wing greyish brown except for part of wing overlapped by hind wing, triangular area between posterior part of postmedial and subterminal, and area between subterminal and terminal fascia, all of which are white. Underside of hind wing white except for broad, double, diffuse postmedial band, most strongly marked posteriorly; well marked subterminal and terminal. Colour of markings as in fore wing.

Abdomen white ventrally and laterally; segments 2 to 7 (and sometimes 8) pale greyish brown dorsally, each segment with white posterior margin and single, white, medial line.

Male genitalia (Text figures 34-37). Tegumen narrow, bulbous, constricted at base and produced laterally; vinculum well developed, broad posteriorly; saccus long, digitate. Valve (?) small, digitate. Uncus small, elongate, digitate, produced anteriorly then recurved to shield dorsal surface of anus. Socius digitate, shorter than uncus. Anellus well developed, with pair of digitate outcurved posterior processes. Aedeagus (text figure 35) strongly arcuate, bifurcate at base. Subscaphium strongly developed, carinate and minutely scobinate posteriorly, invaginated anteriorly to form deep, strongly sclerotised pocket immediately ventral to anus. 8th tergite (text figure 37) very strongly developed, with large valve-like lobe on either side. 8th sternite very strongly sclerotised, rugose (text figure 36).

Female (Plate 1, figure 8). 28.6, 26.8-32.0 mm., (10). As for male but with narrower antennae (as in female *semipavonaria* Walker) and 7th abdominal sternite glabrous except for few short setae.

Female genitalia (Text figure 33). Posterolateral margin of pre-ostial segment forming double collar at base of ostial segment. Sternite of ostial segment with conspicuous, heavily sclerotised, concave, reniform plate ventromedially. Bursa copulatrix with single, narrow, elongate signum on dorsal surface; ductus bursae long; ostium situated at end of everted, posteriorly directed sclerotised tube. Ostial segment well developed. Ovipositor lobes moderately well developed, with sclerotised band encircling base.

Material examined. British Museum (Nat. Hist.). CHINA: 3 ♂, Kwanhsien, July, August 1930, (G. M. Franck); 1 ♂, Kwanhsien, 28. vii. 1925; 1 ♂, Omei-shan, vi. - vii. 1910, (Barry); 1 ♂, 1 ♀, Chia-Ting-Fu, 1000ft., July 1889, (A. E. Pratt); 2 ♂, 2 ♀, Siao-Lou, 1807-1903; 1 ♂ Omei-Shan, 3500ft., June and July 1890; 1 ♂, Tsekou, 1898, (P. Dubernard); 1 ♀, Tien-Tsuen, 1897; 1 ♀, Szechwan, (Capt. Yankowsky); 1 ♀, C. Yunnan; 2 ♀, Kwei-chow, June and July 1890. TIBET (?): 1 ♀, Frontière du Thibet, 1906.

One female from A-tun-tse (N. Yunnan), in the Museum Koenig, may belong to this subspecies, but probably belongs to different subspecies (not the following race).

*Auzata minuta spiculata* ssp. n.

Type. Holotype male, Prov. Chekiang, Ost Tien-mu-shan, 16. 4. 1931, Höne. Im Museum Koenig, Bonn.

In both sexes the genitalia provide the best diagnostic characters in separating this race from the nominate race.

Male. 28.0, 26.6 - 30.2 mm., (5). As for nominate race but with antemedial fascia of upperside of both wings usually more strongly marked, and comma-shaped part of postmedial fascia on fore wing usually broader.

Male genitalia (Text figures 39 - 41). As for nominate race but with anterior arcuate process of uncus much shorter; valves differently shaped; subscaaphium differently shaped, with much broader anterior invagination; 8th tergite with differently shaped lateral lobes; 8th sternite smaller, as in figure 41.

Female 30.3, 24.6 - 35.4 mm., (10). As for female of nominate race, but with same subspecific features as male *spiculata*.

Female genitalia (Text figure 38). As for nominate race, but without heavily sclerotised plate on pre-ostial sternite; with differently shaped posterolateral margin to pre-ostial tergite; and with everted part of ductus bursae narrower.

Material examined. Museum Koenig, Bonn. CHINA: 1 ♂, 2 ♀, from type locality, 13. iv. - 22. vii. 1931, (H. Höne); 3 ♂, 7 ♀, (including allotype ♀), West Tien-mu-shan, 21. vi. - 27. ix. 1932, (H. Höne).

Two females from Mien-shan (prov. Shansi) may belong to this subspecies.

*Auzata ocellata* (Warren)

*Gonocilix ocellata* Warren, 1896, Novit. zool. 3 : 337.

*Auzata ocellata* (Warren), Hampson, 1897, J. Bombay nat. Hist. Soc. 11 : 287.

*Auzata ocellata* (Warren), Gaede, 1931, Lepid. Cat. 49 : 5.

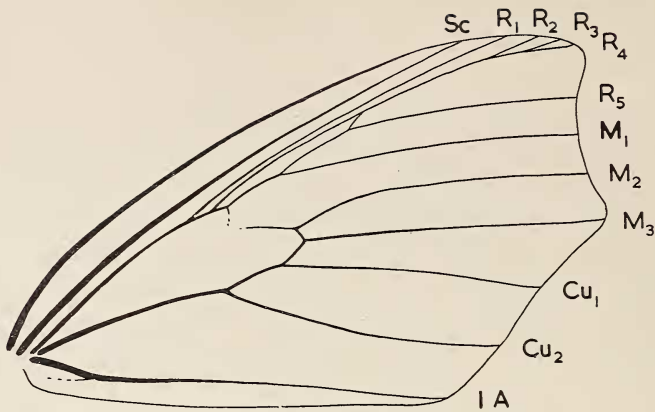
(This species is figured as plate 48 b in Gross-Schmetterl. 2, but there is no corresponding text.)

Type. One male and one female syntype, Khasis, September 1895; Drepanidae genitalia slides No. 564 and 565 respectively.

Distinguished from *minuta* Leech by the sharply angled outer margin of fore and hind wings. Separated from the rest of the genus by the presence of semi-transparent areas in the wings.

Male. 37.4, 33.4 - 44.0 mm., (9). Head dark greyish brown with white posterior margin; palp also dark brown, extending upwards to short distance above labrum. Antenna pale greyish brown dorsally.

Thorax white. Prothoracic and mesothoracic legs with greyish brown outer surface and whitish inner surface. Metathoracic legs entirely whitish. Costal margin of fore wing moderately convex; outer margin strongly angled at  $M_3$ ; apex moderately falcate. Venation as in text figure 42. Upperside of both wings white. (Markings some shade of greyish-brown unless otherwise stated.) Upperside of fore wing with simple antemedial



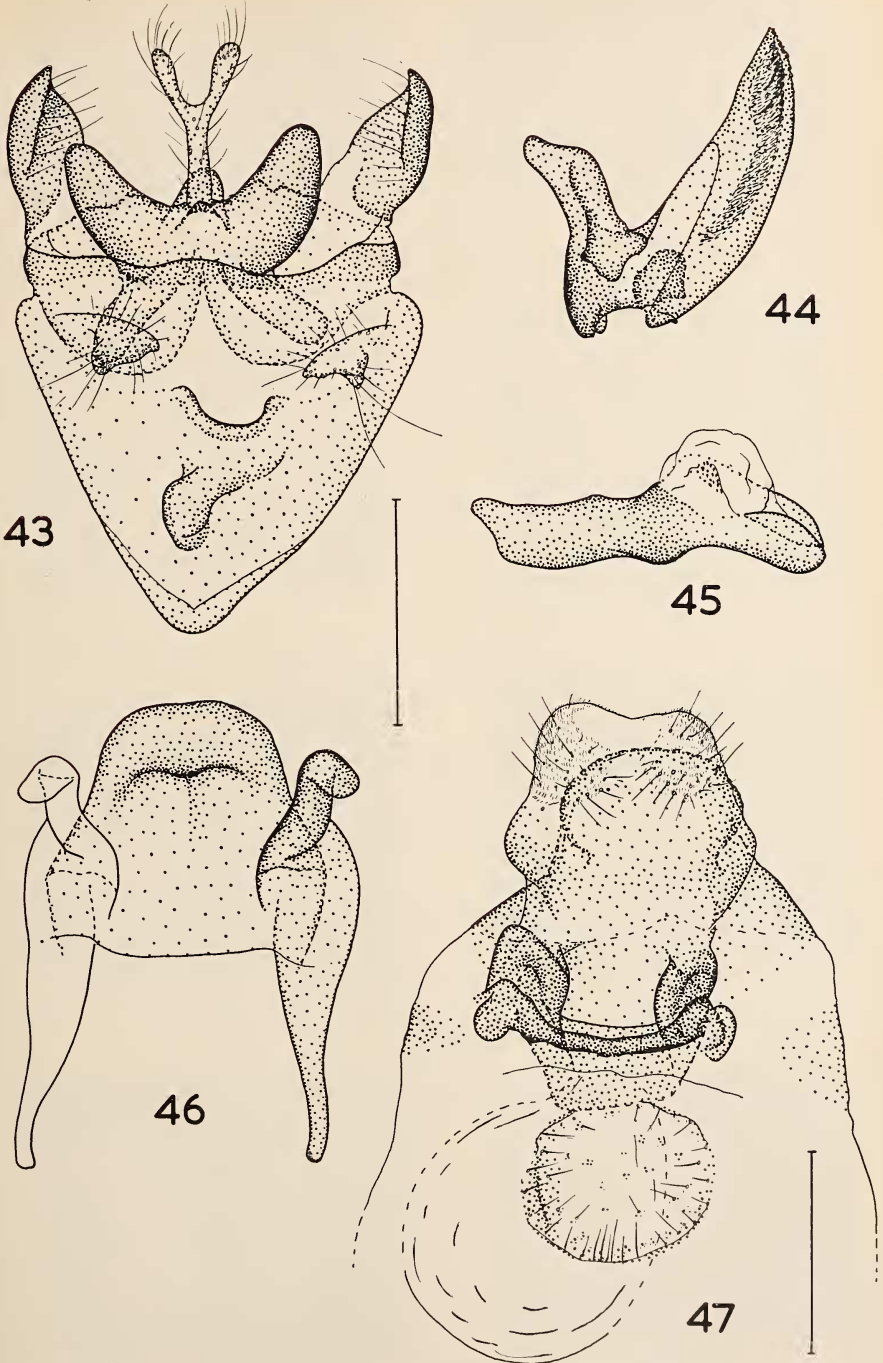
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Fig. 42. *Auzata ocellata* (Warren). Venation of fore wing.

fascia; double postmedial, with comma-shaped posterior part dark brown irrorated with orange scales, extending inwards proximal to end of cell (ct. remaining species of the genus); strongly marked dark brown spot immediately distal to postmedial on 1 A; ovate semi-transparent area between R<sub>4</sub> and R<sub>5</sub> on subterminal fascia; similar but smaller area between M<sub>3</sub> and Cu<sub>1</sub> and between Cu<sub>1</sub> and Cu<sub>2</sub> on subterminal fascia, and a further large circular area between Cu<sub>1</sub> and Cu<sub>2</sub> immediately distal to postmedial; subterminal broad, interrupted by transparent patches, dentate distally; terminal fascia from just anterior to R<sub>5</sub> to tornus, interrupted at M<sub>3</sub> and at Cu<sub>1</sub>; fringe as in *minuta* Leech. Outer margin of hind wing weakly pointed at M<sub>3</sub>. Sc closely approximated to Rs for some distance distal to end of cell. Upperside of hind wing with double antemedial; double postmedial, interrupted between Cu<sub>2</sub> and 1 A, lightly irrorated with orange (proximal line situated proximal to end of cell as in fore wing); dark brown spot on anal margin midway between postmedial and subterminal fasciae; broad semi-transparent area between M<sub>3</sub> and Cu<sub>1</sub>, and slightly smaller patch between Cu<sub>1</sub> and Cu<sub>2</sub> on subterminal; subterminal broad, interrupted by transparent patches, very lightly irrorated posteriorly with orange. Terminal fascia and fringe as for fore wing. Colour and form of colour pattern of underside of both wings similar to *minuta* Leech, but with transparent patches as for upperside (see above).

Abdomen white ventrally and laterally, dorsal surface of segments 2 to 8 greyish brown above, fringed posteriorly with white, and with single white medial line.

Male genitalia (Text figures 43-46). Tegumen deeply emarginate anteromedially, with laterally flattened medial process posteriorly. Vinculum well developed. Saccus small, with asymmetric evagination on



Figs. 43—47. *Auzata ocellata* (Warren). Male genitalia: 43, body of genitalia; 44, eighth abdominal sternite; 45, aedeagus; 46, eighth abdominal tergite; 46, Female genitalia.



left side posteriorly. Valves (?) very small. Uncus slender, bifurcate. Heavily sclerotised lobes on either side of uncus, each with inwardly produced process anteriorly. Gnathus forming uninterrupted carinate band. Socii large. Aedeagus as in text figure 45. 8th tergite well developed (text figure 46). 8th sternite asymmetric (text figure 44): right-hand lobe with deep longitudinal invagination laterally, enclosing densely packed scales and setae.

Female. 46.0, 44.4 - 47.6 mm., (2). As for male but with more slender antennae (as in *semipavonaria* Walker), and 7th abdominal sternite with setose, rounded depression anteriorly.

Female genitalia (Text figure 47). Pre-ostial sternite with rounded posterior depression of densely packed scales and several setae directed towards centre of depression. Peculiar heavily sclerotised structure immediately anterior to ostium, invaginated at base to form membranous sac lying ventral to bursa copulatrix. Bursa copulatrix with single, ventral, ovoid, longitudinally invaginate signum. Ostium protected by heavily sclerotised ostial segment which forms conspicuous bulbous structure dorsally. Ovipositor lobes moderately well developed, with sclerotised, transverse, ventral band at base.

**Distribution:** The range of this species covers Assam, northern Burma and south-eastern China, and it seems probable that south-western China at least could be added to this list. There is apparently no subspeciation.

Material examined. British Museum (Nat. Hist.). INDIA: 2 ♂, 1 ♀, Khasis, Sept. 1896. BURMA: Upper Burma, Hpare, (Capt. A. E. Swann). Museum Koenig, Bonn. CHINA: 1 ♂, 4 ♀, Fukien, Kuantun, 3. iv. - 2. ix. 1938, H. Höne).

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 Authors address: Allan Watson, British Museum (N. H.), Cromwell Road, London.





Fig. 1:  
*Auzata semipavonaria* Walker.  
Male.

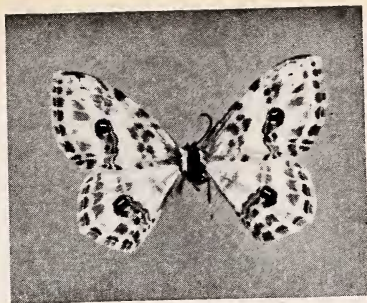


Fig. 2:  
*Auzata chinensis chinensis* Leech.  
Syntype male.

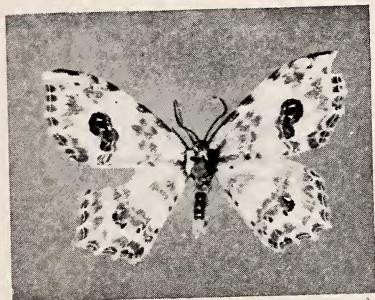


Fig. 3:  
*Auzata chinensis proluxa* ssp. n.  
Male.



Fig. 4:  
*Auzata chinensis arcuata* ssp. n.  
Allotype female.



Fig. 5:  
*Auzata superba superba* (Butler).  
Male.



Fig. 6:  
*Auzata superba cristata* ssp. n.  
Holotype male.

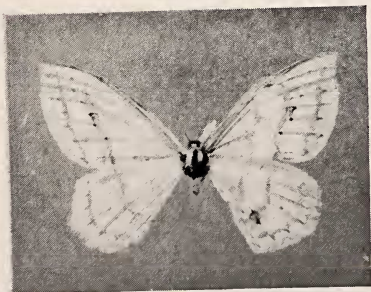


Fig. 7:  
*Auzata simpliciata* Warren.  
Female.



Fig. 8:  
*Auzata minuta minuta* Leech.  
Syntype female.

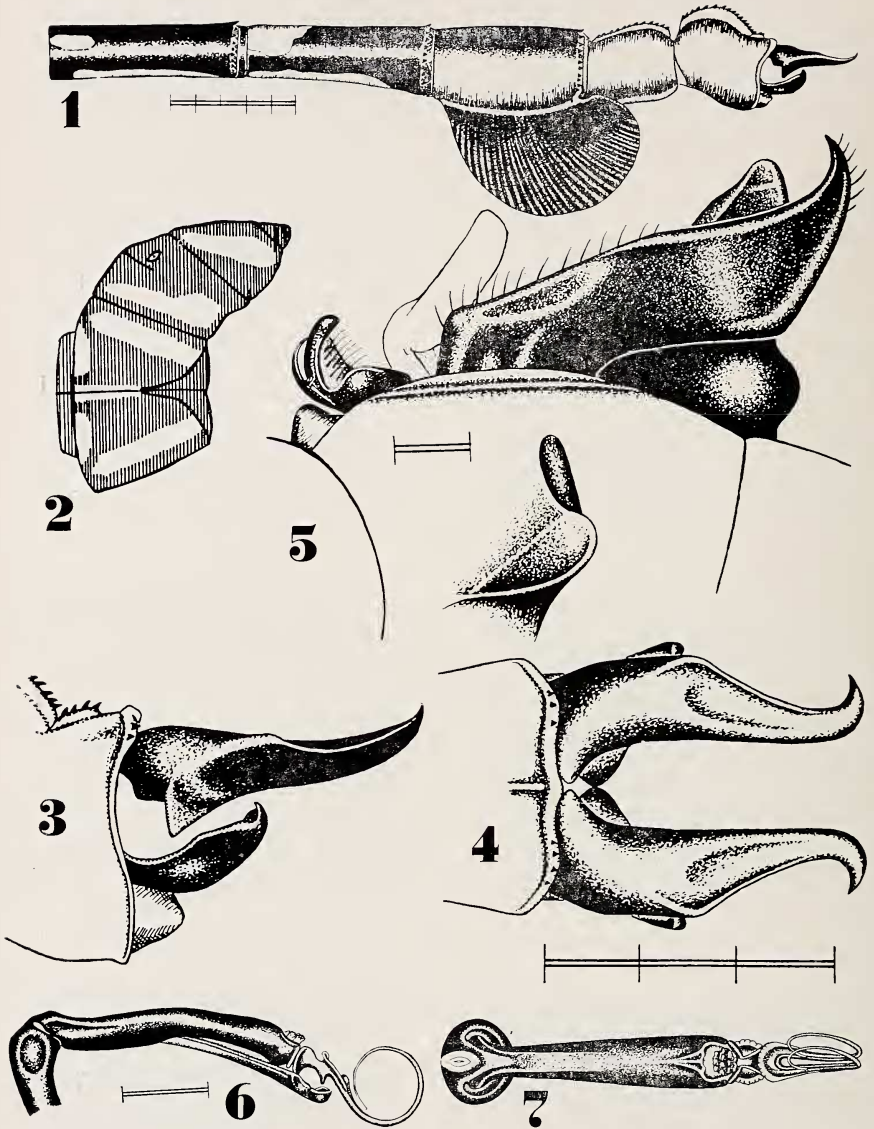


Abb. 1—7, *Phyllogomphus hartwigi* n. sp., Holotypus; je zwei senkrechte Teilstriche der eingezeichneten Maßstäbe begrenzen einen Millimeter. — 1. Apicale Abdomenhälfte, lateral. — 2. Diagramm der Thoraxzeichnung. — 3. und 4. Analanhänge, lateral und dorsal. 5. Genitalsegment, lateral. — 6. und 7. Penis, lateral und ventral.